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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/806,413	03/23/2004	Takahiko Yoshizawa	250890US2S	2289
22850	7590	11/18/2005		
OBLON, SPIVAK, MCCLELLAND, MAIER & NEUSTADT, P.C. 1940 DUKE STREET ALEXANDRIA, VA 22314			EXAMINER SANDVIK, BENJAMIN P	
			ART UNIT 2826	PAPER NUMBER

DATE MAILED: 11/18/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/806,413

Applicant(s)

YOSHIZAWA ET AL.

Examiner

Ben P. Sandvik

Art Unit

2826

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 09 September 2005.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-37 is/are pending in the application.
- 4a) Of the above claim(s) 5-12, 19-26 and 29-37 is/are withdrawn from consideration.
- 5) ☒ Claim(s) 15-18, 27 and 28 is/are allowed.
- 6) ☒ Claim(s) 1-4, 13 and 14 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| Paper No(s)/Mail Date. _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1-4, 13, 14 are rejected under 35 U.S.C. 102(b) as being anticipated by Shimooka et al (U.S. Patent #20020187625).

With respect to **claim 1**, Shimooka teaches an insulating film having dielectric constant not greater than 2.7 and provided above a semiconductor substrate (Fig. 6, 12 and Paragraphs 6 and 7); via comprising a conductive material provided in a via hole formed in the insulating film (Fig. 5, 9b); a first interconnection comprising a conductive material provided in an interconnection trench formed on the in the insulating film (Fig. 5, 9a); and a first high-density region formed in the insulating film (Fig. 6, 11), having a cylindrical shape surrounding the via hole, an inner surface common to a boundary of the via hole, and a film density higher than the insulating film (Paragraph 67 and Paragraph 72, as insulating film 12 is porous the film density of film 11 will be higher than film 12).

With respect to **claim 2**, Shimooka teaches that the first high-density region has the film density greater that the insulating film (Paragraph 67 and

Paragraph 72, as insulating film 12 is porous the film density of film 11 will be higher than film 12).

With respect to **claim 3**, Shimooka teaches that the first high-density region has the maximum film density in a boundary between the via hole and the first high-density region (assuming uniform film density of film 11).

With respect to **claim 4**, Shimooka teaches that a diameter (Fig. 6, inner diameter of 11) of the first high-density region is smaller than a width of the interconnection trench (Fig. 5, 9a).

With respect to **claim 13**, Shimooka teaches that the insulating film consists substantially of an organic polymer having a dielectric constant not greater than 2.7 (Paragraph 72, "porous methyl siloxane").

With respect to **claim 14**, Shimooka teaches an insulating film having a porosity not lower than 15% and a film density not greater than 1.2 g/cm^3 (both properties of methyl siloxane).

Allowable Subject Matter

Claims 15-18, 27, and 28 allowed.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Ben P. Sandvik whose telephone number is (571) 272-8446. The examiner can normally be reached on Mon-Fri.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Nathan Flynn can be reached on (571) 272-1915. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).


NATHAN J. FLYNN
SENIOR PATENT EXAMINER
TECHNOLOGY CENTER 2800

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